

What is claimed is:

1. A seal element for use in a packer comprising:

an energizing element; and

a sealing layer covering at least a portion of the energizing element;

in which the energizing element uses potential energy stored in the energizing element to maintain contact between the sealing layer and a wall enclosing the packer.
2. The seal element of claim 1 in which the energizing element is a metallic substrate.
3. The seal element of claim 1 in which the energizing element is a composite material.
4. The seal element of claim 1 in which the energizing element is a helically slotted tube.
5. The seal element of claim 1 in which the energizing element is a cage substrate having substantially parallel slotted members.
6. The seal element of claim 1 in which the energizing element is a spring.
7. The seal element of claim 1 in which the energizing element is a bow.
8. The seal element of claim 1 in which the sealing layer is rubber, elastomeric, metallic, or thermoplastic.
9. The seal element of claim 1 in which the wall is an inner surface of a pipe.
10. The seal element of claim 1 in which the wall is a wellbore.
11. The seal element of claim 1 further comprising a support sleeve disposed around the energizing element.
12. The seal element of claim 11 in which the support sleeve is made of metal.

13. The seal element of claim 11 in which the support sleeve is embedded in the sealing layer.

14. An energized seal element for use in a packer deployed in a well comprising:

an energizing element;

a support sleeve at least partially enclosing the energizing element; and

a sealing layer at least partially enclosing the support sleeve;

in which the energizing element keeps the sealing layer in sealing contact with a wall enclosing the packer.

15. The seal element of claim 14 in which the energizing element uses stored potential energy to maintain a contact force on the support layer in various operating environments.

16. The seal element of claim 14 in which the energizing element, when actuated, deforms elastically into the support layer to produce a radially outward force on the sealing layer.

17. The seal element of claim 14 in which the sealing layer is a thin layer of conformable material.

18. A method of sealing a well annulus comprising:

placing a packer having an energized seal element in a wellbore;

setting the packer by actuating the energized seal element to form a seal between the packer and a wall surrounding the packer; and

maintaining the seal using potential energy stored in the energized seal element.

19. The method of claim 18 in which the actuating of the energized seal element is performed by deforming an elastic substrate of the energized seal element.

20. The method of claim 19 in which the deforming is performed by axially compressing the elastic substrate to produce a radially outward expansion.

21. A sealing apparatus to seal a well annulus comprising:

a tubing disposed in a well; and

a plurality of energized seal elements placed in series along the exterior of the tubing;

in which the energized seal elements use potential energy stored in an underlying energizing element of the energized seal element to maintain a sealing force.